

Newspaper articles are a great resource for studying how scientific ideas change through time. Aurora and other 'space weather' phenomena have been described in newspapers since at least the early-1800s.

In this activity, you will examine an archive of newspaper stories and investigate how scientific theories and hypothesis about the terrestrial effects of solar activity have changed over time. You will find this resource at:



<http://www.solarstorms.org>

- 1) What kinds of human impacts are covered by the discussions at this website?
- 2) How credible do you think this resource is?
- 3) Where did you find the newspaper archive?
- 4) How many significant solar storm events were covered by this archive?
- 5) What were the five most significant storms reported since 1850?
- 6) Examine the newspaper accounts. Briefly describe each of the 'new' ideas about aurora and solar storms that were mentioned by reporters. Can you give examples of ideas that became popular but then stopped being quoted? What do you think was the reason for this change?
- 7) Compare a proposed explanation for aurora from 1850-1880, and compare it with ideas from a much later time from 1950-1980. In what ways are the ideas similar? In what ways are they different? Why do you think the older idea stop being used?

Goal: Students will use an Internet resource to answer questions about space weather events, and how our explanations for them have changed in time. They will use actual newspaper reports, and distill from what they read, how our explanations have changed. They will also evaluate the website for its credibility, and veracity. This later issue is an important one that all students have to address as they continue to use the internet in their academic research.

8) What kinds of human impacts are covered by the discussions at this website?

Answer: Satellite damage, electrical blackouts, human radiation exposure, etc.

9) How credible do you think this resource is? **Answer:** The site appears to be written by a professional astronomer who has written a book on the subject 'The 23rd Cycle'. His resume lists his affiliation with NASA, and his research papers in astronomical journals.

10) Where did you find the newspaper archive? **Answer:** It was found under the Resources tab, and then by following the links for 'History' and 'Newspaper Archives'.

11) How many significant solar storm events were covered by this archive? **Answer:** A direct count of the number of dates gives 99 storm events.

12) What were the five most significant storms reported since 1850? **Answer:** Based on the number of newspaper descriptions the largest storms were on August 28, 1859; November 18, 1882; November 1, 1902; March 9, 1918; May 13, 1921; January 25, 1938; July 6, 1941; September 18, 1941; February 11, 1958; November 13, 1960; March 13, 1989.

13) Examine the newspaper accounts. Briefly describe each of the 'new' ideas about aurora and solar storms that were mentioned by reporters. Can you give examples of ideas that became popular but then stopped being quoted? What do you think was the reason for this change? **Answer:** This may vary depending on the particular examples chosen by the student. Students need to provide proper citations for the examples found, (i.e. New York Times, August 29, 1859, page 3).

14) Compare a proposed explanation for aurora from 1850-1880, and compare it with ideas from a much later time from 1950-1980. In what ways are the ideas similar? In what ways are they different? Why do you think did older idea stop being used? **Answer:** For example, auroras as sunlight reflected from glaciers [ca 1850s] versus electrons from space colliding with atoms of oxygen and nitrogen. Students may reply by saying 'They are similar in that they both produce light. They are different because the first one involves reflected light from ice while the second involves emitted light by atoms. The older idea stopped being used because it was replaced by a newer idea that was more often used by scientists, probably based on new data collected by them over a span of 100 years.' Students may also uncover specific reasons in the articles themselves, if debates between the two ideas are mentioned by reporters.